

PATENT APPLICATION  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF

ROLF WIEDERMANN ET AL

SERIAL NUMBER: 08/362,547

FILED: JANUARY 3, 1995

TITLE: A PROCESS FOR THE PRODUCTION OF RIGID FOAMS CONTAINING URETHANE GROUPS AND PREDOMINANTLY ISOCYANURATE GROUPS

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) GROUP NO.: 1207  
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) EXAMINER: J. COONEY  
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APPEAL BRIEF

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

This Brief, submitted in triplicate, is an appeal from the Final Office Action of the Examiner dated February 6, 1996, in which the rejection of Claims 3-9 was maintained.

I. REAL PARTY IN INTEREST

This application was assigned to Bayer AG by each of the named inventors.

II. RELATED APPEALS AND INTERFERENCES

There are no pending appeals or interferences of which Appellants are aware that would be affected by or have a bearing on the Board's decision in this appeal.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on 7/3/96

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Name of applicant, assignee or  
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July 3, 1996

Date

### III. STATUS OF CLAIMS

The above-referenced application was filed with Claims 1-8.

Claims 1-2 were cancelled and Claim 9 was added in an amendment dated October 23, 1995.

Claims 3-9 are pending but stand rejected. Claims 3-9 are the subject claims of this appeal.

### IV. STATUS OF AMENDMENTS

Appellants filed no amendments after rejection.

### V. SUMMARY OF THE INVENTION

The present invention is directed to a process for the production of flameproofed, CFC-free rigid foams. (In order to assist the Honorable Board in its evaluation of the invention, reference will be made to the specification in which "P" will designate a page number and "L" will designate the line number(s)). These foams contain urethane groups and predominantly isocyanurate groups. This process comprises reacting 1) polyisocyanates, with 2) from 30 to 90 parts by weight of compounds containing at least two isocyanate-reactive hydrogen atoms, having molecular weights of from 400 to 10,000, and containing branched chains, in the presence of 3) blowing agents consisting essentially of C<sub>1</sub> to C<sub>6</sub> hydrocarbons, 4) from 10 to 60 parts by weight of flameproofing agents, and 5) from 10 to 20 parts by weight of compounds containing at least two isocyanate-reactive hydrogen atoms and having molecular weights of from 32 to 399 as crosslinking agents. The parts by weight of components 2), 4) and 5) total 100, and the reaction is conducted at an index range of from 200 to 600 (P1, L29 through P2, L34).

### VI. ISSUES

Whether Claims 3-9 are unpatentable under 35 U.S.C. 103 over the Volkert reference (U.S. Patent 5,096,933), the Volkert et al reference (U.S. Patent 5,205,956) or the Volkert et al reference (U.S. Patent 5,300,534).

### VII. GROUPING OF CLAIMS

Claims 3-9 are appealed together.

## VIII. ARGUMENTS

CLAIMS 3-9 ARE NOT RENDERED OBVIOUS BY THE VOLKERT REFERENCE (U.S. PATENT 5,096,933), THE VOLKERT ET AL REFERENCE (U.S. PATENT 5,205,956) OR THE VOLKERT ET AL REFERENCE (U.S. PATENT 5,300,534).

Appellants respectfully submit that one of ordinary skill in the art has no insight into the presently claimed invention upon reading any of these references, either alone or in combination with each other. The presently claimed process clearly results in improved rigid foams which contain urethane and predominantly isocyanurate groups. The rigid foams produced by the present invention do not exhibit surface brittleness which adversely affects the adhesion between the foam and the surface skin. These foams exhibit good flame resistance and are dimensionally stable.

As discussed at P1, L5-18 of the present application, when water is used as the blowing agent, rigid foams having a brittle surface, and, thus, poor adhesion between the foam and surface skin result. Hydrocarbon blowing agents are known to overcome the problems associated with surface brittleness. However, these blowing agents require the quantity of flameproofing agents to be increased and result in rigid foams which are not dimensionally stable and exhibit shrinkage and/or contraction. Foams produced by the presently claimed process overcome these problems associated with prior art rigid foams. ✓

The Volkert et al references, U. S. Patents 5,205,956 and 5,300,534, are related patents. The '534 patent is a divisional of the '956 patent. Thus, these two references have the exact same specification, with the exception of the claims. Accordingly, Appellants will direct their comments specifically to the '956 patent.

Appellants respectfully submit that one of ordinary skill in the art has no insight into the presently claimed invention from these two references. These references relate to blowing agents comprising at least one vinylfluoroalkane of the specified formula to prevent ozone depletion (column 1, line 59 through column 2, line 15). The vinylfluoroalkanes are disclosed as being suitable blowing agents and ✓

insulating gas in the production of plastic foams and rigid foams. Vinylfluoroalkanes are clearly excluded from the present claims.

It is Appellants' position that the Volkert et al references provide no information which would lead one of ordinary skill in the art to "arrive at" the presently claimed invention. What information therein would motivate the skilled artisan to use only organic hydrocarbons containing 1 to 6 carbon atoms as blowing agents and exclude the vinylfluoroalkanes required by these references? Appellants respectfully submit that one of ordinary skill in the art would either expect the resultant foams to lack flame resistance or to be dimensionally unstable (i.e., exhibit shrinkage and/or contraction). This is evident from the background section of the present application (see P1, L12-18).

No information is disclosed in the Volkert et al references which would lead one of ordinary skill in the art to a different conclusion. Appellants respectfully submit that the skilled artisan simply has no insight into the presently claimed invention upon reading these references.

The Volkert reference (U.S. Patent 5,096,933) discloses a process for preparing polyurethane rigid foams having low thermal conductivity using blowing agents comprising cyclopentane, cyclohexane, or mixtures thereof and optionally, low boiling compounds. Appellants respectfully submit that one of ordinary skill in the art has no insight into the presently claimed invention upon reading the '933 patent. As discussed hereinabove, the skilled artisan would expect the use of only hydrocarbons as blowing agent in combination with flameproofing agents at the presently required amounts to result in dimensionally unstable foams (see P1, L12-18). Although flameproofing agents are broadly disclosed by this reference, there is no information as to how to overcome this problem associated with these blowing agents in the presence of flameproofing agents.

Appellants direct the Board's attention to the fact that all of the examples of the '933 patent are at an isocyanate index of about 110. Flameproofing agents are also not present in any of these examples. Flame resistant foams are clearly the subject of the present invention (P1, L1-2). Appellants' claims require an isocyanate index of about 200 to 600, and a specific formulation in terms of quantities of

components 2), 4) and 5). It is also necessary that component 2) have branched chains. This particular combination enables the production of rigid polyisocyanurate foams which are both flame resistant and dimensionally stable. This is simply not suggested by the '933 patent.

Upon reviewing the examples of the present application, it becomes evident that these factors are essential. Polyol A (P8, L4-20) is a polyol formulation which is outside the scope of the present claims. Polyols B, C and D (P8, L23 through P10, L13) are representative of the present invention. Examples 1 and 2 in Table 1 (P11) are comparative. Examples 1-4 in Table 2 (P12) are representative of the present invention, and Example 5 in Table 2 (P12) is comparative. Examples 1 and 2 in Table 1 clearly demonstrate that a polyol formulation outside that presently required does not result in dimensionally stable foams. These two examples were conducted at isocyanate indices of 219 and 351, respectively. Example 5 in Table 2 clearly demonstrates that using a polyol formulation as specified by the presently claimed invention alone is not sufficient. Example 5 was conducted at an isocyanate index of 142 which is clearly outside the scope of the present claims.

Appellants further submit that Examples 1-4 in Table 2 clearly support patentability of the presently claimed invention. These examples use both a polyol formulation within the scope of the present claims and an isocyanate index of from 200 to 600. One of ordinary skill in the art simply has no insight into the fact that dimensionally stable foams which are flame retardant can be produced from the presently required formulation, and isocyanate indices.

In view of the preceding remarks, Appellants submit that each of the Examiner's rejections is in error and respectfully request that the rejections be reversed and that Claims 3-9 be allowed.

Respectfully submitted,

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## APPENDIX: CLAIMS ON APPEAL

3. The process of Claim 9 wherein pentane is used as the organic blowing agent.
4. The process of Claim 9, wherein cyclopentane is used as the organic blowing agent.
5. The process of Claim 9, wherein a mixture of 15 to 50% by weight n- and/or isopentane and 85 to 50% by weight cyclopentane is used as the organic blowing agent.
6. The process of Claim 9, wherein hexane is used as the organic blowing agent.
7. The process of Claim 9, wherein cyclohexane is used as the organic blowing agent.
8. The process of Claim 9, wherein mixtures of pentane, cyclopentane, hexane and/or cyclohexane are used as the organic blowing agent.
9. A process for the production of rigid foams containing urethane groups and predominately isocyanurate groups comprising reacting:
  - 1) polyisocyanates with
  - 2) from 30 to 90 parts by weight of compounds containing at least two isocyanate-reactive hydrogen atoms, having molecular weights of from 400 to 10,000, and containing branched chains, in the presence of
  - 3) blowing agents consisting essentially of C<sub>1</sub> to C<sub>6</sub> hydrocarbons,
  - 4) from 10 to 60 parts by weight of flameproofing agents, and
  - 5) from 10 to 20 parts by weight of compounds containing at least two isocyanate-reactive hydrogen atoms and having molecular weights of from 32 to 399 as crosslinking agents,wherein the parts by weight of components 2), 4) and 5) total 100, and wherein the reaction is conducted at an index range of from 200 to 600.